INCH-POUND

MIL-PRF-1/999B
27 August 1999
SUPERSEDING
MIL-E-1/999A
13 June 1972

PERFORMANCE SPECIFICATION SHEET

# ELECTRON TUBE, GAS SWITCHING
# TYPE 6163

This specification is approved for use by all Departments and Agencies of the Department of Defense.

The requirements for acquiring the electron tube described herein shall consist of this document and the latest issue of MIL-PRF-1.

DESCRIPTION: ATR, broadband, Fo = 9,050 MHz.

ABSOLUTE RATINGS:

| Parameter: / Unit: | Incident power kw | Du --- | TA (nonoperating) °C | Alt ft |
|---|---|---|---|---|
| Maximum: | 250 | 0.001 | +100 | 10,000 |
| Minimum: | 4 | --- | -40 | --- |

PHYSICAL CHARACTERISTICS:

Dimensions: See figure 1.
Mounting position: Any.
Test mounts: See figures 2, 3, and 4.
Weight: 0.13 pound (approximate).
Application: 6/

TEST CONDITIONS:

| Parameter: Unit: | Incident power kw | tp µs | prr pps | σ' --- | F MHz |
|---|---|---|---|---|---|
| Tolerance: | ±5% | ±0.15 | ±10% | Max | --- |
| Test condition 1: | 4 | 0.5 | 1,000 | --- | F4 |
| Test condition 2: | 20 | 1.0 | 1,000 | 1.02 | F3 |
| Test condition 3: | 200 (min) | 1.0 | 1,000 | 1.2 | F4 |

| Frequency | | |
|---|---|---|
| F | MHz | ± |
| 1 | 9,050 | --- |
| 2 | 9,050 | 0.1% |
| 3 | 9,050 | 1.0% |
| 4 | 9,050 | 3% |

GENERAL:

Preproduction sample approval: Required. 1/

TABLE I. Testing and inspection.

| Requirement or test | Method | Notes | Test | Conditions | Symbol | Limits | | Unit |
|---|---|---|---|---|---|---|---|---|
| | | | | | | Min | Max | |
| Preproduction sample approval inspection | | 1/ | | | | | | |
| Loaded Q | 4461 | 2/ | --- | Fo = F1 | QL | --- | 6.5 | --- |
| High-level VSWR | 4474 | 2/ | 2 | | VSWR | --- | 1.15 | --- |
| Degradation due to vibration | 4021 | --- | --- | | --- | --- | --- | --- |
| Conformance inspection, part 1 | | 3/ | | | | | | |
| Tuning susceptance | 4482 | 2/ | --- | Fo = F2; g = 0.05 | b | -0.06 | +0.06 | --- |
| Firing time | 4486 | 4/ | 1 | | t | --- | 10 | sec |
| Arc loss | 4488 | 4/ | 1 | | La | --- | 0.8 | dB |
| Electrical symmetry | --- | 2/ 5/ | --- | Fo = F2; g = 0.05 | --- | --- | 0.06 | cm |
| Temperature cycling (nonoperating) | 1027 | --- | --- | | --- | --- | --- | --- |
| Conformance inspection, part 2 | | | | | | | | |
| Dielectric material strain | 4101 | --- | --- | | --- | --- | --- | --- |
| Normalized conductance | 4484 | 2/ | --- | Fo = F2 | g | --- | 0.06 | --- |
| Recovery time | 4471 | 2/ | 3 | | t | --- | 10 | µs |
| Conformance inspection, part 3 | | | | | | | | |
| Life test | --- | 7/ | 3 | Group D | t | 500 | --- | hrs |
| Life-test end points: | --- | | | | | | | |
| Tuning susceptance | 4482 | 2/ | --- | Method A; Fo = F2; g = 0.05 | b | -0.08 | +0.08 | --- |
| Arc loss | 4488 | 4/ | 1 | | La | --- | 1.0 | dB |
| Normalized conductance | 4484 | 2/ | --- | Fo = F2 | g | --- | 0.1 | --- |
| Recovery time | 4471 | 2/ | 3 | | t | --- | 15 | µs |
| Temperature cycling life test | 1027 | --- | --- | Group D; 10 cycles (min) | --- | --- | --- | --- |

See footnotes at top of next page.

TABLE I. Testing and inspection - Continued.

1/ Preproduction sample approval requirements hereby replace any qualification requirements referable to the product covered herein. The term "First article testing" shall be considered as synonymous with the term "Preproduction sample approval testing." All tests applicable herein (including all preproduction sample approval and conformance inspection, parts 1, 2, and 3) shall be performed during preproduction sample inspection. A failure of any one tube in any of the tests shall be cause for decision of preproduction sample disapproval.

2/ The tube under test (TUT) shall be mounted in test mount A as detailed in figures 2 and 3.

3/ Unless otherwise specified, the acceptance level for all tests listed under conformance inspection, part 1, shall be 1.0. Acceptance shall be based upon accept on zero (c = 0) sampling plan, in accordance with Table III of MIL-PRF-1.

4/ This test shall be performed at least 168 hours after pumping and at least 24 hours after any previous discharge.

5/ The shift in position of the voltage minimum, resulting from reversing the TUT in the test mount, shall be within the specified limits when measured in an RG-51/U waveguide.

6/ This tube is designed for application in pairs mounted in the wide walls of RG-51/U waveguide.

7/ The TUT shall be mounted in test mount B as detailed in figure 4.

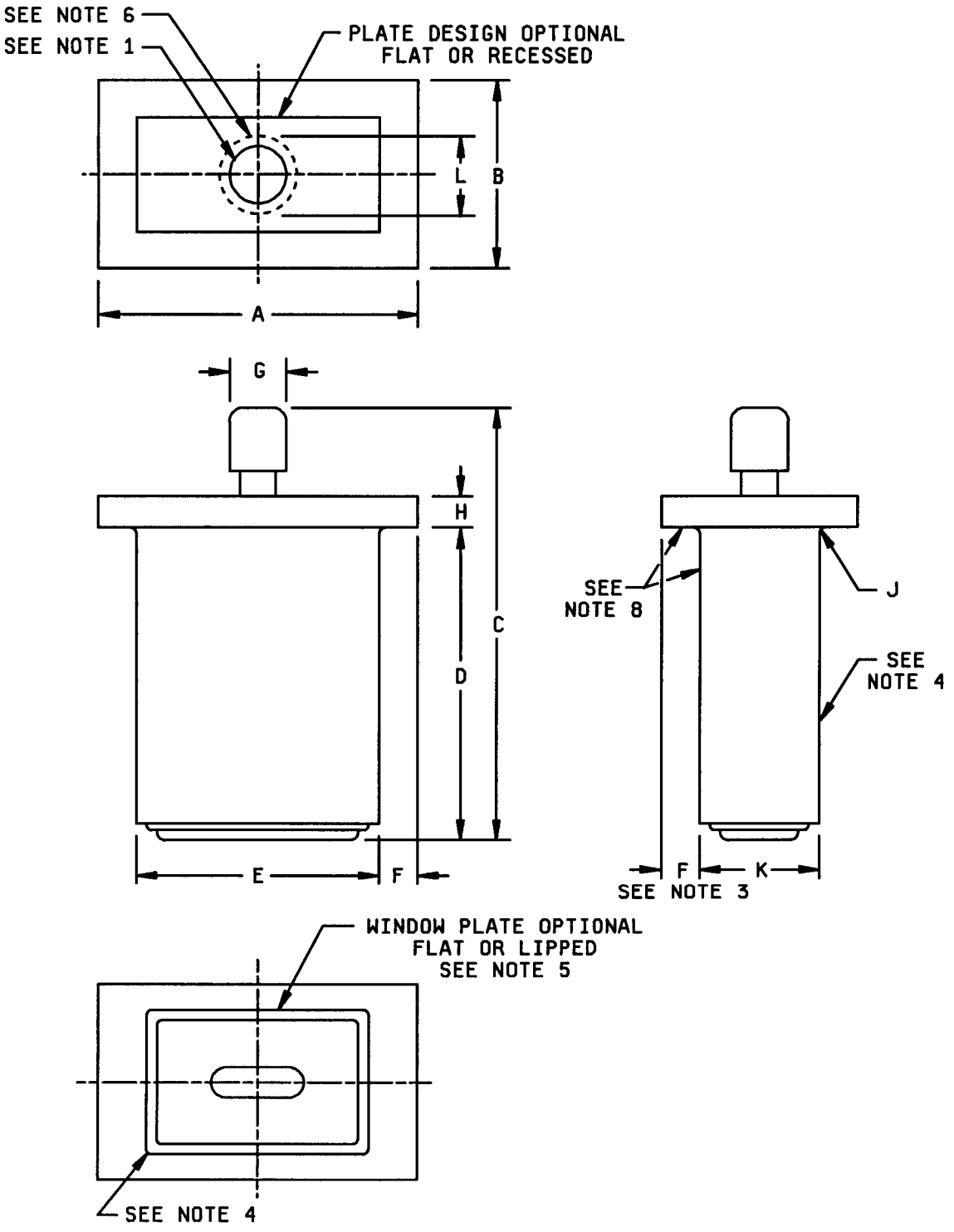


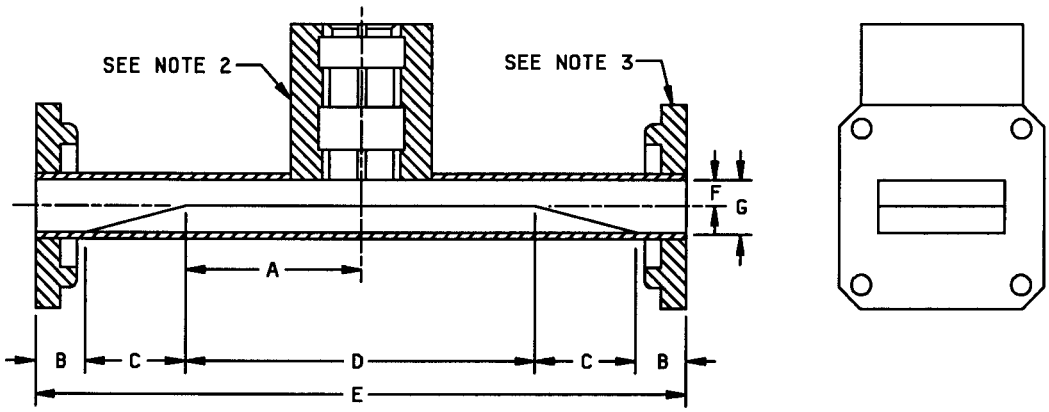

FIGURE 1. Outline drawing of electron tube type 6163.

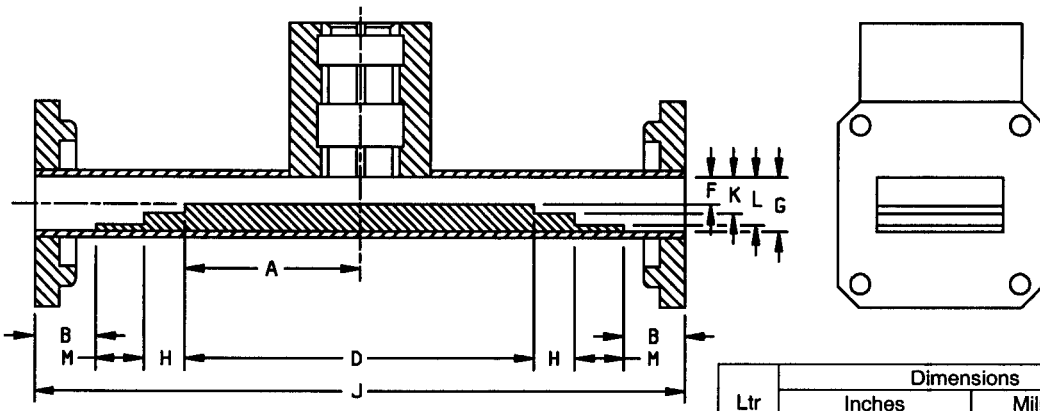
| Ltr | Dimensions | | | |
|---|---|---|---|---|
| | Inches | | Millimeters | |
| | Min | Max | Min | Max |
| Preproduction sample approval inspection (see note 9) | | | | |
| G | --- | .281 | --- | 7.14 |
| Conformance inspection, part 1 (see note 10) | | | | |
| A | 1.265 | 1.285 | 32.13 | 32.64 |
| B | .770 | .780 | 19.56 | 19.81 |
| C | --- | 1.719 | --- | 43.66 |
| D | 1.296 | 1.302 | 32.92 | 33.07 |
| F | .125 | --- | 3.18 | --- |
| Conformance inspection, part 2 | | | | |
| E | .995 | 1.005 | 25.27 | 25.53 |
| H | .117 | .133 | 2.97 | 3.38 |
| J | --- | .020 Rad | --- | 0.51 Rad |
| K | .495 | .505 | 12.57 | 12.83 |
| L | --- | .438 | --- | 11.13 |

NOTES:

1. The tubulation shall fall within a circle .438 inch (11.13 mm) diameter maximum located from the center lines of the end plate.
2. An optional cosmetic silver plate 100 MSI minimum or equivalent finish may applied, at the manufacture's discretion.
3. Applies to four walls for full length from radius J to window plate.
4. Four long edges of tube body shall have a .020 inch (0.51 mm) ± .010 inch (0.25 mm) approximate radius.
5. A radius of .031 inch (0.79 mm) maximum or a chamfer of .016 inch (0.41 mm) x 45° maximum permissible on the window plate corners.
6. Spread of solder to be held within area shown.
7. No gaskets are to be used with this tube.
8. These surfaces on all four sides shall be perpendicular to each other within .010 inch (0.25 mm) for full length of body from radius J to window plate.
9. Preproduction sample approval requirements hereby replace any qualification requirements referable to the product covered herein. The term "First article testing" shall be considered as synonymous with the term "Preproduction sample approval testing." All tests applicable herein (including all preproduction sample approval and conformance inspection, parts 1, 2, and 3) shall be performed during preproduction sample inspection. A failure of any one tube in any of the tests shall be cause for decision of preproduction sample disapproval.
10. Unless otherwise specified, the acceptance level for all tests listed under conformance inspection, part 1, shall be 1.0. Acceptance shall be based upon accept on zero (c = 0) sampling plan in accordance with Table III of MIL-PRF-1.

FIGURE 1. Outline drawing of electron tube type 6163 - Continued.




ALTERNATE DESIGN OF TEST MOUNT

| Ltr | Dimensions | | | |
|---|---|---|---|---|
| | Inches | | Millimeters | |
| | Min | Max | Min | Max |
| Conformance inspection | | | | |
| A | 1.590 | 1.610 | 40.39 | 40.89 |
| C | 3.190 | 3.210 | 81.03 | 81.53 |
| D | 3.190 | 3.210 | 81.03 | 81.53 |
| F | .248 | .250 | 6.30 | 6.35 |
| G | .494 | .500 | 12.55 | 12.70 |
| H | .396 | .406 | 10.06 | 10.31 |
| K | .309 | .313 | 7.85 | 7.95 |
| L | .371 | .375 | 9.42 | 9.53 |
| M | .394 | .414 | 10.01 | 10.52 |
| Reference dimensions | | | | |
| B | .50 | | 12.70 | |
| E | 10.59 | | 268.99 | |
| J | 5.81 | | 147.57 | |

NOTES:
1. Method of fabrication optional.
2. Dimensions of socket shown on figure 3.
3. Flanges may be UG-51/U or UG-52A/U.
4. All internal edges to have .015 inch (0.38 mm) to .031R inch (0.79 mm).

FIGURE 2. Test mount "A" outline

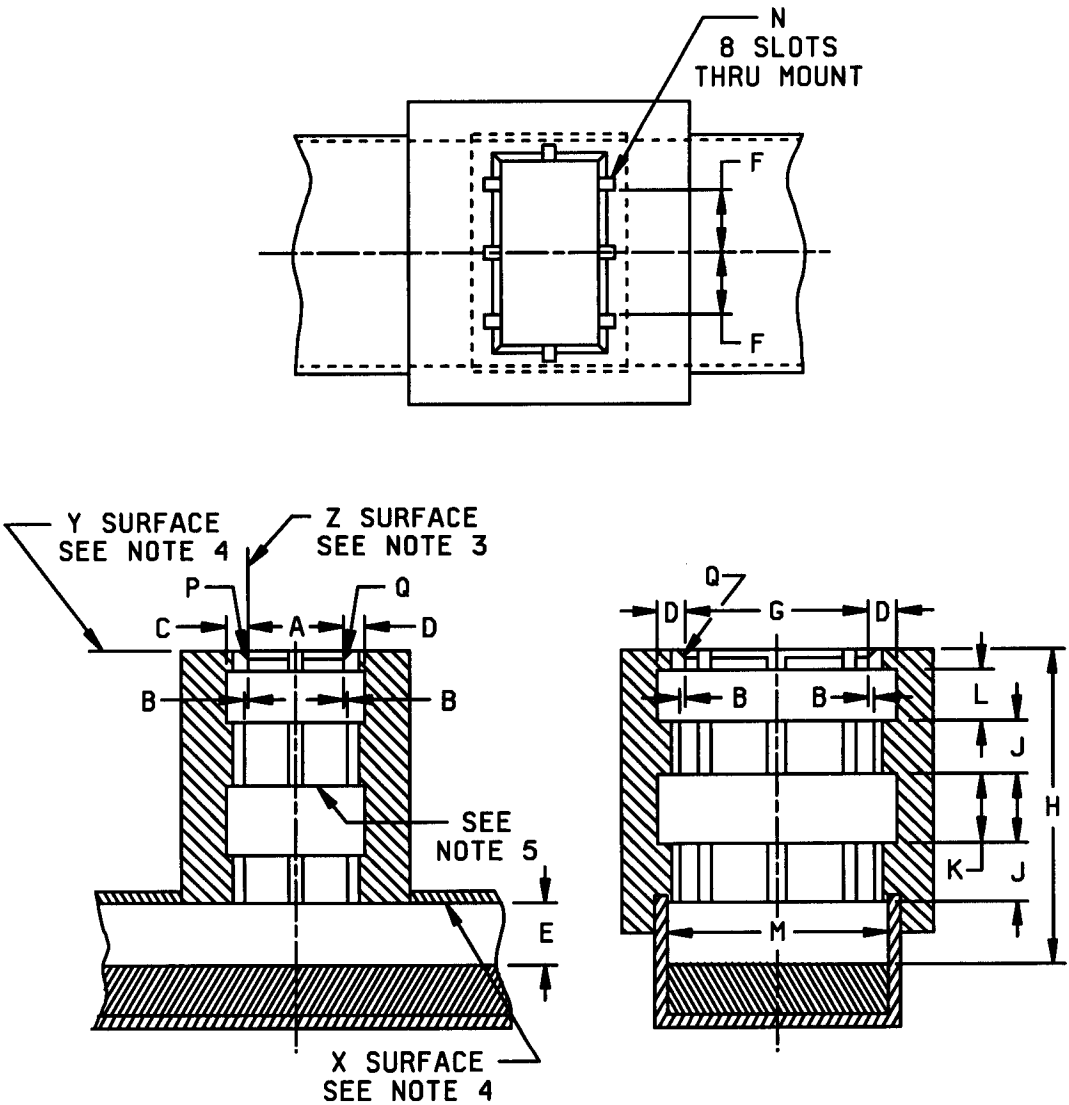


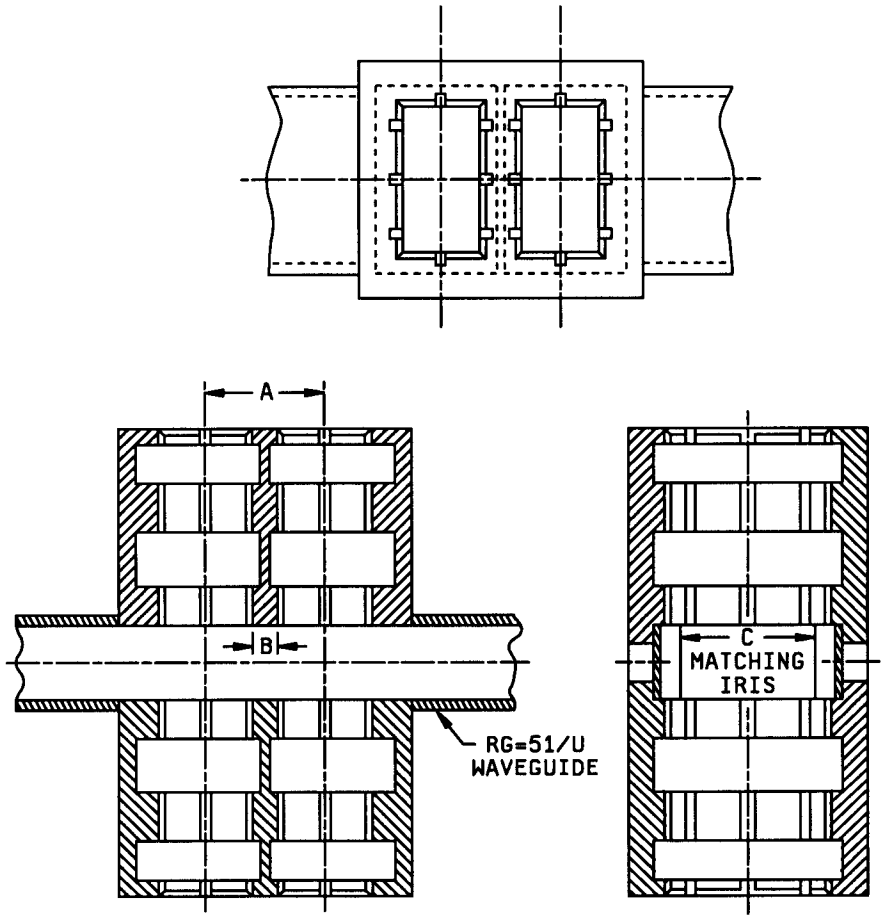

FIGURE 3. Test mount "A" details.

| Ltr | Dimensions | | | |
|---|---|---|---|---|
| | Inches | | Millimeters | |
| | Min | Max | Min | Max |
| Conformance inspection | | | | |
| A | .506 | .511 | 12.85 | 12.98 |
| B | .016 | .020 | 0.41 | 0.51 |
| C | .126 | .135 | 3.20 | 3.43 |
| D | .196 | .205 | 4.98 | 5.21 |
| G | 1.006 | 1.012 | 25.56 | 25.70 |
| H | 1.550 | 1.554 | 39.37 | 39.47 |
| J | .288 | .298 | 7.32 | 7.57 |
| K | .352 | .362 | 8.94 | 9.19 |
| L | .257 | .267 | 6.53 | 6.78 |
| Reference dimensions | | | | |
| E | .249 | | 6.32 | |
| F | .344 | | 8.74 | |
| M | 1.122 | | 28.50 | |
| N | .062 x .062 | | 1.57 x 1.57 | |
| P | .031 TYP | | 0.79 TYP | |
| Q | .031 x 45° TYP | | 0.79 x 45° TYP | |

NOTES:

1. Method of fabrication optional.
2. Suitable clamp shall be provided to insure proper seating of tube in mount.
3. Pressure shall be provided to press the tube against surface "Z".
4. Surfaces "X" and "Y" shall be parallel within ± 0°5'.
5. All internal edges to have .015 R inch (0.38 mm) to .031R inch (0.79 mm).

FIGURE 3. Test mount "A" details - Continued.




| Ltr | Dimensions | | | |
|---|---|---|---|---|
| | Inches | | Millimeters | |
| | Min | Max | Min | Max |
| A | .799 | .801 | 20.29 | 20.35 |
| B | .122 | .128 | 3.10 | 3.26 |
| C | 21.41 | 21.57 | 543.8 | 547.9 |

NOTES:

1. Internal dimensions of each socket same as detail of test mount "A".
2. Method of fabrication optional.
3. Suitable clamps shall be provided to insure proper contact of tubes in mount.
4. Matching IRIS for dimension C: .846 ± /003 inches (21.49 ± .08 mm).

FIGURE 4. Test mount "B".

Custodians:
Army - CR
Navy - EC
Air Force - 80
DLA - CC

Review activities:
Army - AR, MI
Navy - AS, CG, MC, OS, SH
Air Force - 11, 17, 19, 99

Preparing activity:
DLA - CC

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